

FINAL INSTAR LARVA OF THE EMBOLEMID WASP,
AMPULICOMORPHA CONFUSA (HYMENOPTERA)

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Abstract.—The development of the embolemid wasp *Ampulicomorpha confusa* is similar to that of dryinids. The embolemid larva is enclosed in a sac bulging from its homopteran host, and the sac is of larval origin. The final instar is described, and notes are provided on the occurrence of embolemids in Texas.

Key Words: Embolemidae, Achilidae, larva

Recent works on the Chrysidioidea, culminating in that of Carpenter (1986), have greatly clarified relationships within this superfamily. The resulting classification provides a convenient framework for the observations recorded here on the Embolemidae. Members of this family are rarely collected, and what little is known about their biology is limited to the observations of Bridwell (1937, 1958). Buegis (1987) provides a recent summary, including morphological observations for the family as a whole and collection records for European species.

In 1982, I reared a single male of *Ampulicomorpha confusa* Ashmead. Unfortunately, additional attempts to rear this species have failed. The results presented here add few new details to the observations of Bridwell (1958), but do clarify some aspects of the biology of *A. confusa*.

MATERIALS AND METHODS

On February 13, 1982, I collected several nymphs of *Epiptera floridiae* (Walker) (Homoptera, Achilidae) in San Jacinto County, Texas. The habitat was identical to that described by Bridwell (1958): beneath loose bark of rotting conifer logs. Two of these nymphs had sacs bulging laterally between

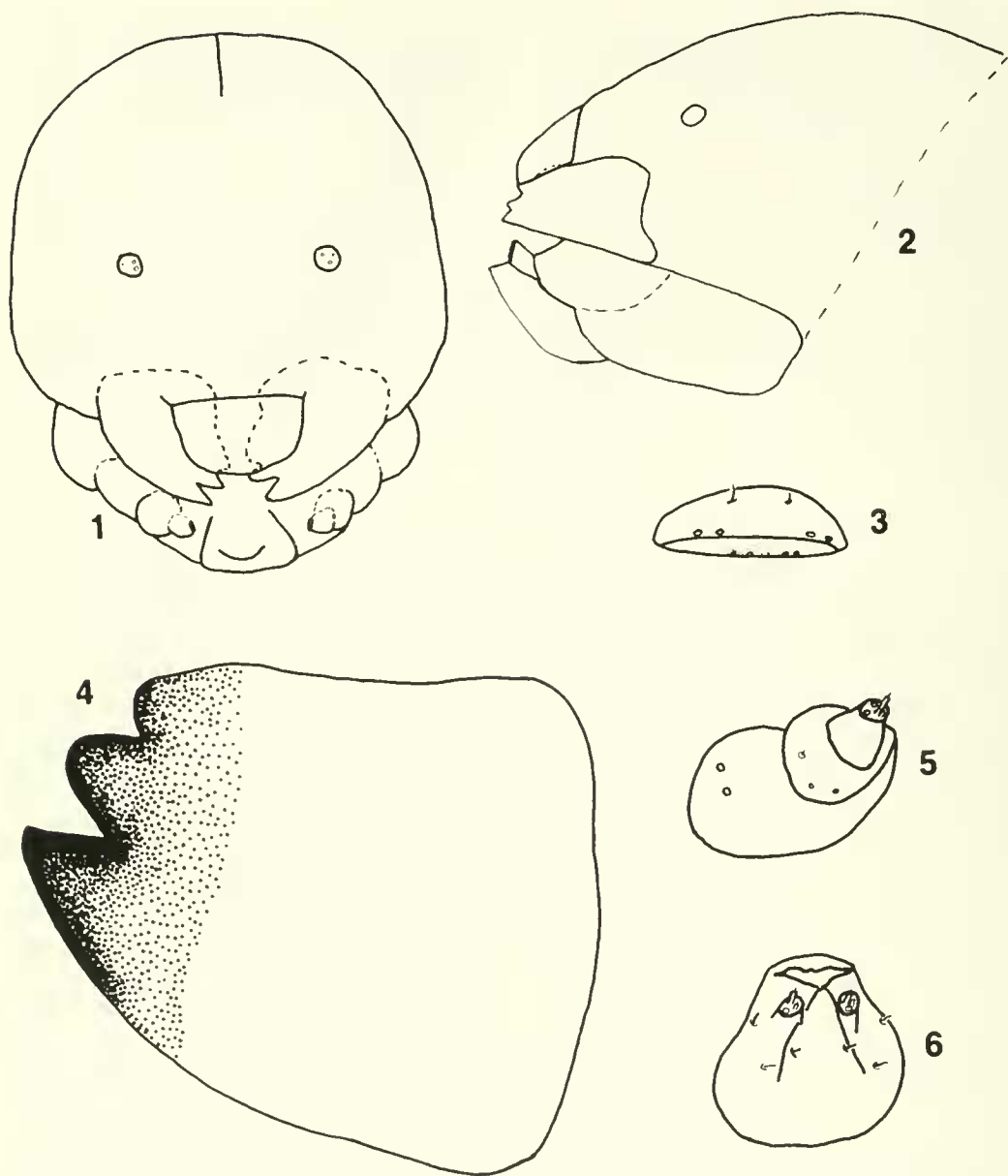
the second and third abdominal segments. These two nymphs were placed in a separate vial with pieces of bark and kept under observation for the next six weeks.

Members of two other wasp families (Rhopalosomatidae and Dryinidae) develop in sacs on their exopterygote hosts, and representatives of these were used for comparison in the description of the embolemid larva and its sac. Four crickets (Gryllidae) parasitized by rhopalosomatids were collected in College Station, Texas, in September of 1987 and 1988. Determined and undetermined dryinids were also examined; determined material consisted of host remains of reared specimens in the genera *Anteon* and *Pseudogonatopus*; undetermined material included approximately 2 dozen homopteran hosts containing dryinid larvae in sacs bulging from their bodies. The latter were from numerous localities and were all preserved in 70% ethanol.

All hosts and parasitoids were identified by the author, and voucher specimens have been deposited in the Texas A&M University Collection as TAMU voucher #228.

RESULTS AND DISCUSSION

The embolemid sacs bulging from the nymphal achilids were identical in appear-



Figs. 1-6. Head and mouth parts of final instar larva of *Ampulicomorpha confusa*. 1, frontal view 100 \times . 2, lateral view, 100 \times . 3, labrum, ventral view showing part of epipharyngeal region, 160 \times . 4, left mandible, frontal view, 400 \times . 5, maxilla, ventral-lateral view, 160 \times . 6, labium, ventral view, 160 \times .

ance to those produced by the larvae of dryinids on their homopteran hosts. These sacs were in fact embolemid larval exuviae, as evidenced by the rows of spiracles along the sides of the sacs. As Carpenter (1986) has noted, Bridwell's (1958) description did not

clearly address the question of whether the tissue composing the sacs was of host or parasitoid origin. The observations here confirm the parasitoid origin of the sac.

As in most dryinids I have examined, the embolemid sac is more or less transversely

oriented to the body of the host as opposed to the longitudinal orientation of the saes produced by rhopalosomatid larvae on their gryllid hosts. In addition, the posterior portion of the rhopalosomatid body is attached in anchor-like fashion while the head remains free. The rhopalosomatid larva lies stretched out along the side of its host. Dryinid and embolemid larvae have the head more completely buried in the host's body, and are doubled up in the sac (and thus cyphosomatic).

One embolemid larva emerged from its host within two weeks and spun a cocoon on the bark. The cocoon was identical to that described by Bridwell (1958). On March 22nd of the same year, a male *A. confusa* emerged from this cocoon. The remaining embolemid larva was preserved in 70% ethanol after it emerged from its host. The brief description given below is of this second larva. The body was poorly preserved and certain details are not evident.

The larva of *Ampulicomorpha* is readily distinguished from that of *Rhopalosoma* since the spinnerets of the latter are paired and palpiform. Detailed comparisons will be needed, however, before the larvae of embolemids can be distinguished from those of other chrysidoids. Evans (1987) provides a synopsis of existing data on chrysidoid larvae. The large, tridentate mandibles separate the larvae of *A. confusa* from those of known dryinids, but few of the latter have been described. Some chrysidids and bethylids also have tridentate mandibles, hence *A. confusa* larvae key to these families in couplet 50 of Evans (1987).

Chrysidoid larvae are insufficiently known to permit placement of embolemids on the basis of larval morphology alone. The developmental biology and host associations, however, clearly confirm the sister group relationship between embolemids and dryinids, as outlined by Carpenter (1986).

I have collected adults of *A. confusa* in Malaise traps from April through June in central Texas. In the same traps, I have col-

lected male *Embolemus* from May through October. The two genera are readily distinguished on the basis of the relatively larger, more quadrate pronotum and weaker fore wing venation of *Ampulicomorpha*. The females of *Embolemus*, as far as is known, are apterous.

Description of Larva.—3.5 mm long, mostly white, mandibular teeth dark brown; body segments and head capsule distinct. Spiracles and atrium simple, without distinct peritreme, diameter of spiracle varying from 0.024 mm on abdomen to 0.036 mm on thorax. Integument largely smooth, not obviously setose or spinose. Head (Figs. 1, 2) more or less prognathous, 0.60 mm wide, 0.62 mm long (length measured dorsally between apex of labrum and posterior margin of head capsule), without evident parietal bands but with a median ecdysial line posteriorly. Antenna small, round, not protruding, bearing 3 minute sensilla. Clypeus distinct distally, but frontal-clypeal suture not visible; labral-clypeal suture below or extending anteriorad base of mandibles. Labrum (Fig. 3) dorsally with a pair of distinct setae and a group of smaller sensilla along anterior margin; epipharynx at least medially covered with minute sensilla. Mandibles large, tridentate in frontal view (Fig. 4), the teeth decreasing in length mesally. Maxillae (Fig. 5) weakly bilobate, simple, with large, protruding palpi, the latter with 4 minute sensilla; a galea was not observed. Labium (Fig. 6) with large median spinneret and a pair of distinct palpi.

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